

II. RESPONSE TO OFFICE ACTION

Claims 8, 9, 10, 12, 16, 17, 20, 21, 22, 23, 24, 25, 26, 28 and 29 have been amended to even more particularly point out and claim the subject matter of the claims. Claims 52-84 have been added. Claims 8-35 and 52-84 are pending in the present application.

Support for the new claims and claim amendments may be found in the claims as originally filed and throughout the Specification, for example, at page 3, lines 4-16; page 3, line 28 to page 4, line 6; Page 6, lines 29-31; Page 7, lines 11-16; page 17, line 30 to page 18, line 6; page 22, line 18 to page 23, line 3; and page 24, lines 14-17.

A. The 35 U.S.C. § 102 Rejection Over Eason

The Examiner rejected claims 8-33 and 35 under 35 U.S.C. §102(b) as being unpatentable over U.S. Patent No. 3,897,829 to Eason. Applicants respectfully traverse these rejections for the following reasons.

Amended independent claim 8 recites, in part, an aerial dispersion system configured for use with a fixed wing host aircraft and that includes two or more modular aerial dispersant holding tanks that are configured to be sequentially loaded into the fixed wing host aircraft and coupled together within the fixed wing host aircraft to provide a dispersant material flow path, and that are configured with a shape and outer dimensions that correspond to dimensions of a cargo container employed in the side-loading cargo system of the fixed wing host aircraft, or that are configured for installation and removal from an aircraft passenger compartment of the fixed wing host aircraft through a passenger door opening of the fixed wing host aircraft. Amended

independent claim 22 recites, in part, an aircraft-based material dispersion system that includes two or more modular aerial dispersant holding tanks sequentially disposed within a fixed wing host aircraft and coupled together within the fixed wing host aircraft to provide a dispersant material flowpath, and that are configured to be compatible with a side-loading aircraft cargo system of the fixed wing host aircraft or that are configured for installation and removal from an aircraft passenger compartment of the fixed wing host aircraft through a passenger door opening of said fixed wing host aircraft.

In order to support an anticipation rejection under 35 U.S.C. § 102(b), each and every element of the rejected claim must be found in the cited art. In the present case, Eason does not disclose a system including *two or more modular* aerial dispersant holding tanks that are configured to be *sequentially* loaded into the fixed wing host aircraft and *coupled together* within the fixed wing host aircraft to provide a dispersant material flow path as recited by amended independent claim 8. Nor does Eason disclose a system including *two or more modular* aerial dispersant holding tanks *sequentially* disposed within a fixed wing host aircraft and *coupled together* to provide a dispersant material flowpath. Instead, Eason describes and illustrates a *single tank* 12 installed in a *helicopter* (see Col. 3, line 56 to Col. 4, line 1; and Figures 1 and 2).

Furthermore, Eason does not teach or suggest anything about modular aerial dispersant holding tanks that are sequentially loaded/disposed and coupled together to provide a dispersant material flow path. In this regard, Eason actually *teaches away* from such an implementation because the helicopter of Eason lacks sufficient interior space to accommodate more than the single disclosed tank 12, and therefore modification of Eason to use more than one tank 12 would be impossible or at most would render it unsatisfactory for its intended purpose. “If

proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification” (see MPEP 2143.01). Thus, claims 8 and 22, and the claims dependent there from, are both novel and non-obvious over Eason for this reason alone.

Eason also fails to disclose, teach or suggest anything about a *fixed wing aircraft*, side-loading cargo systems of a fixed wing aircraft, a passenger compartment of a fixed wing host aircraft, or aerial dispersant holding tanks configured for compatibility or installation and removal from the same in the manner recited by the subject claims. The tank 12 of Eason is not configured with a shape and outer dimensions that correspond to dimensions of a cargo container employed in the side-loading cargo system of the fixed wing host aircraft (see discussion below regarding claim 9), and is not configured for installation and removal from an aircraft passenger compartment of a fixed wing host aircraft through a passenger door opening of the fixed wing host aircraft. Furthermore, Eason discloses nothing about a side-loading aircraft cargo system or compatibility therewith. Thus, claims 8 and 22 and the claims dependent therefrom, are further novel and non-obvious over Eason for this additional reason.

Claims dependent from independent claims 1 and 22 include other limitations not disclosed, taught or suggested by Eason that render these claims further novel and nonobvious over the respective base claim. For example, amended dependent claim 9 is directed to aerial dispersant holding tanks configured with a shape and outer dimensions that correspond to dimensions of a cargo container employed in the side-loading cargo system of the host (fixed wing) aircraft. As described in Exhibit A attached hereto, “container type and build-up must be appropriate to the type of aircraft used to move the cargo. Not all sizes are used on all aircraft”

(see Exhibit A, “UPS Air Cargo Containers and Pallets,” <http://www.aircargo.ups.com/aircargo/using/services/services/domestic/svc-containers.html>, page 1). In this regard, Exhibit B illustrates examples of cargo aircraft with side loading cargo doors with which the cargo containers of Exhibit A are employed see Exhibit B, “UPS Air Cargo Aircraft”, <http://www.aircargo.ups.com/aircargo/using/services/services/domestic/svc-aircraft.html>, pages 1-7). Exhibit C gives further information concerning compatibility between particular aircraft and cargo containers and aircraft and cargo container compatibility (see Exhibit C, “Delta Shipping Containers”, “Aircraft & Container Compatibility Chart”, http://www.delta.com/prog_serv/cargo/ship_cont/index.jsp, page 1).

In the present case, Eason does not disclose an aerial dispersant holding tank configured with a shape and outer dimensions that correspond to dimensions of a cargo container employed in the side-loading cargo system of a host fixed wing aircraft. Nor does Eason teach or suggest so configuring an aerial dispersant holding tank. To the contrary, Eason describes and illustrates a U-shaped tank 12 that is “adaptable for fitting about opposite sides of the rotor transmission housing 22 [of the helicopter]” (see Col. 3, lines 65-67). Thus, Eason actually *teaches away* from this limitation of the claims.

Amended dependent claim 16 recites a cargo door configured to be *removably disposed within a cargo opening* of the host aircraft, and wherein the airborne dispersal device is configured to be coupled to the dispersal regulator *through the cargo door*. Amended dependent claim 17 recites a passenger door configured to be *removably disposed within a passenger door opening* of the host aircraft, and wherein the airborne dispersal device is configured to be coupled to the dispersal regulator *through the passenger door*. Eason discloses *no door*, much

less a cargo or passenger door through which an airborne dispersal device is configured to be coupled to the dispersal regulator. Thus Eason fails to disclose, teach or suggest these limitations of claims 16 and 17. Similar arguments apply to dependent claims 28 and 29.

Amended dependent claim 25 is directed to a system that includes two or more of aerial dispersant holding tanks coupled together and removably disposed in adjacent front end-to-rear end relationship within the baggage or cargo hold of the host aircraft. With regard to original claim 25, the Examiner points at page 3 of the Office Action to “opening/passageways at the lower extremities of tanks 12”. However, Applicant points out that port 28 of Eason’s single tank 12 is actually a drain port and port 34 is actually a filler port (*see* Col. 5, lines 43-52). Ports 28 and 34 are not positioned for coupling together tanks 12 in adjacent *front end-to-rear end* relationship as claimed. Furthermore, as previously described, Eason does not disclose, and actually *teaches away* from, coupling together two or more tanks 12. Similar arguments apply to dependent claims 12 and 26.

Dependent claim 35 depends from claim 22, and recites that the host aircraft comprises a wide body aircraft. The Examiner states in the Office Action that “the aircraft of Eason has been considered for the purpose of this rejection as ‘wide bodied.’” (*see* page 5 of the Office Action). However, Applicant points out that a “wide body aircraft” is a term that describes a particular type of aircraft and that Eason does not disclose, teach or suggest anything about a wide-body aircraft, *i.e.*, “a large airliner with a fuselage diameter of about 6 metres and twin aisles” (*see* Exhibit D, “Definition of Wide-body aircraft”, http://www.wordiq.com/definition/Wide-body_aircraft).

Regarding dependent claims 18, 19, 31 and 32, the Examiner points to Figure 6 of Eason (*see* page 4 of the Office Action). However, Figure 6 of Eason merely illustrates a schematic diagram of the *fluid pumping system* of the fire suppression unit, and *discloses nothing* regarding a control subsystem (claims 18 and 31), or a navigation subsystem, a communications subsystem, and a sensor subsystem coupled to a control subsystem, or a control subsystem, navigation subsystem and communications subsystem configured to be coupled to one or more systems of a host aircraft (claims 19 and 32). If the Examiner maintains this rejection, Applicant requests the Examiner to indicate where *each* of the elements of claims 18, 19, 31 and 32 are disclosed in Eason.

For at least the above given reasons, claims 8-33 and 35 are novel and nonobvious over Eason. Applicant therefore respectfully requests that the rejection of these claims be withdrawn. Favorable reconsideration is requested.

B. The 35 U.S.C. § 103 Rejection Over Eason and McConnell

The Examiner rejected claim 34 under 35 U.S.C. §103 as being unpatentable over U.S. Patent No. 3,897,829 to Eason in view of U.S. Patent No. 6,622,966 to McConnell. Applicants respectfully traverse this rejection for the following reasons.

Amended independent claim 22 has been shown above to be novel and nonobvious over Eason, and McConnell adds nothing in this regard. Claim 34 depends from claim 22 and in thus non-obvious over Eason in view of McConnell. Applicant therefore respectfully requests that the rejection of this claim be withdrawn. Favorable reconsideration is requested.

C. New Claims 52-84

New independent claim 64 recites, in part, an aircraft-based material dispersion system comprising a *wide-body host aircraft*. As described above in relation to dependent claim 35, such a limitation is not disclosed, taught or suggested by Eason. Thus, new independent claim 64 is novel and nonobvious over Eason.

New claims 52-63 and 65-84 depend from one of the pending independent claims. These independent claims have all been shown above to be novel and nonobvious over Eason. Therefore, the new dependent claims are also novel and nonobvious for at least the same reasons. However, the new dependent claims include additional limitations that render them further novel and nonobvious over Eason.

For example, new dependent claims 54, 57 and 66 each recite a *commercial passenger or cargo plane*. New dependent claims 63 and 65 each recite a host aircraft having a *gross carrying capacity of greater than or equal to about 100,000 pounds*. New dependent claim 55 recites installing at least first and second aerial dispersant holding tanks into a baggage or cargo hold of the host fixed wing aircraft by slidably or rollably transporting the first and second aerial dispersant holding tanks within the baggage or cargo hold in a forward or rearward direction parallel to the longitudinal axis of the aircraft fuselage; and *stacking the first and second aerial dispersant holding tanks in adjacent front end-to-rear end relationship* within the baggage or cargo hold of the host aircraft.

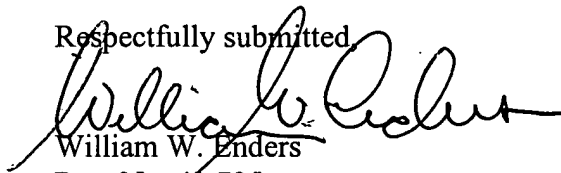
The limitations of these new dependent claims render these claims even further novel and non-obvious over Eason.

D. Conclusion

The pending claims have been shown above to be allowable over the cited references. Applicants therefore respectfully submit that claims 8-35 and 52-84 are in condition for allowance. Reconsideration of the application and claims is courteously solicited.

The Examiner is invited to contact the undersigned attorney at (512)-347-1611 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,


William W. Enders
Reg. No. 41,735
Attorney for Applicants

O'Keefe, Egan & Peterman, LLP
1101 S. Capital of Texas Highway
Building C, Suite 200
Austin, Texas 78746
512/347-1611
FAX 512/347-1615

Date: 11/24/04



EXHIBIT A

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Service Guide

Services

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Service Guide

→ [Service Explanation](#)

→ [Aircraft](#)

→ [Containers & Pallets](#)

UPS Air Cargo

Next Steps

United States
800.535.2345
(toll free)

CONTAINERS AND PALLET

Below are the external dimensions and 3-D diagrams for each container and pallet type utilized by UPS Air Cargo. Container type and build-up must be appropriate to the type of aircraft used to move the cargo. Not all sizes are used on all aircraft.

A2N, [M1N](#), [L9N](#), [L11](#), [A2N](#) pallet, [M1N](#) pallet

For more information about the internal dimensions available for cargo build-up, please call the [Service Center](#) at 800.535.2345.

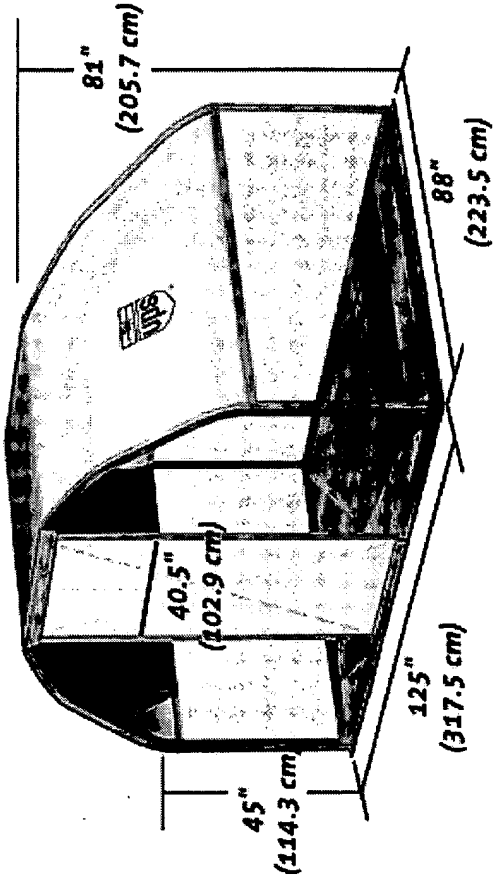
Guaranteed...

Priority →

Confidence:

Reserved →

A2N CONTAINER

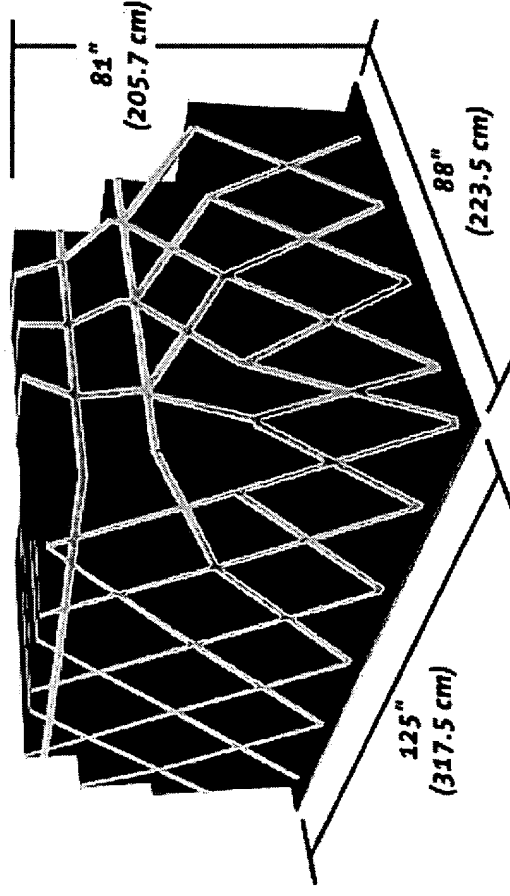


Maximum Accepted Weight: Varies by aircraft type.

Maximum Cubic Utilization: 420 cu. ft. (11.89 cu. m.)
Note: The A2N container is a modified A2.
Please call 800.535.2345 for further details.

[↗Back to Top](#)

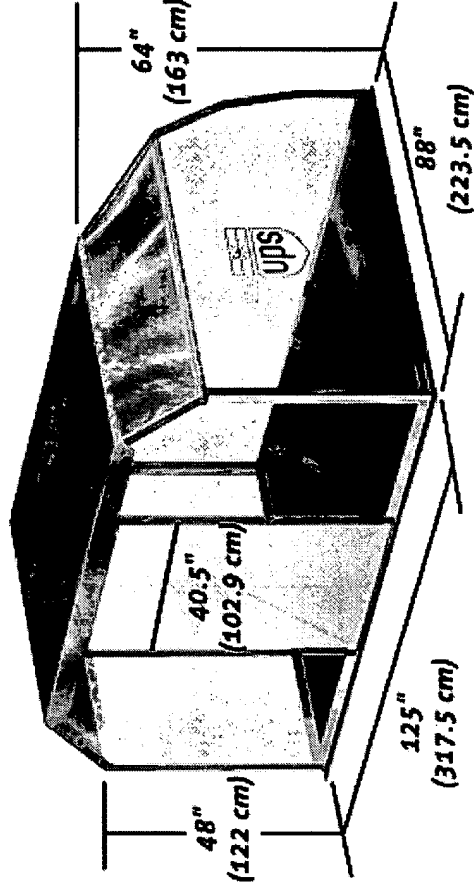
A2N PALLET



Maximum Accepted Weight: Varies by aircraft type.
Maximum Cubic Utilization: 420 cu. ft. (11.89 cu. m.)

[↗Back to Top](#)

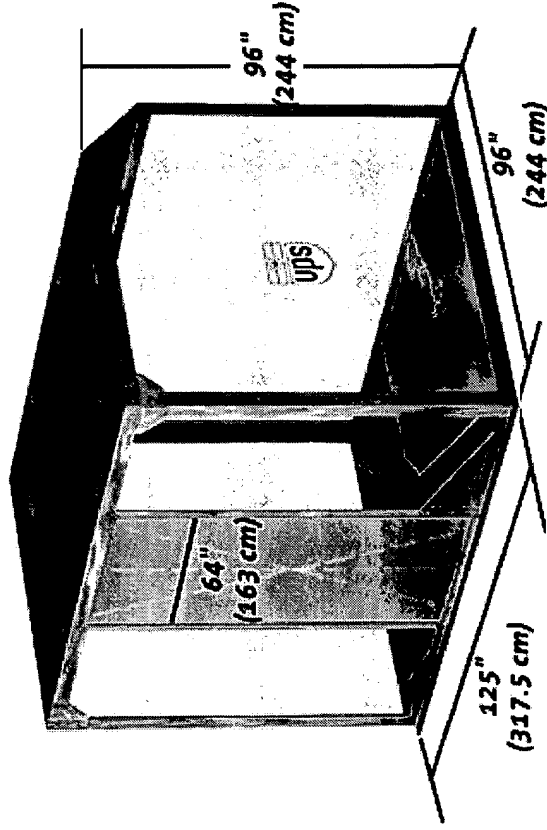
L9N CONTAINER



Maximum Accepted Weight: Varies by aircraft type.
Maximum Cubic Utilization: 365 cu. ft. (10.34 cu. m.)
Note: The L9N container is a modified L9.
Please call 800.535.2345 for further details.

[↩Back to Top](#)

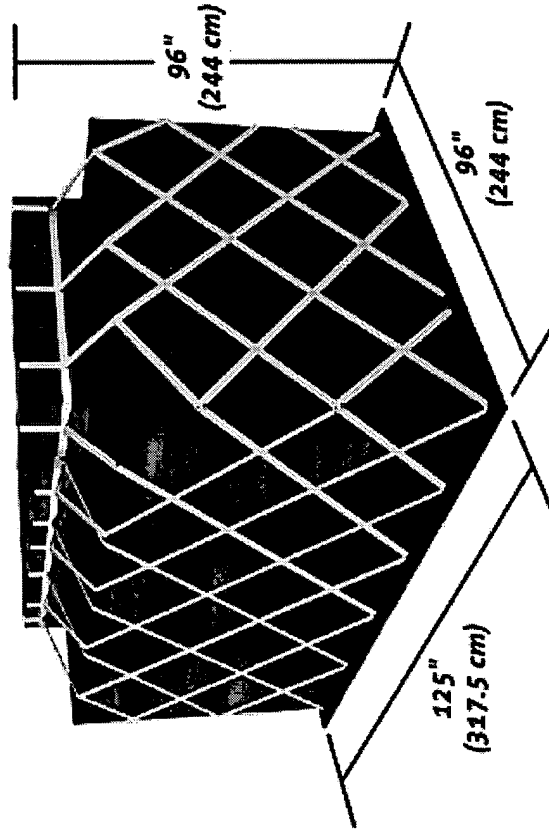
M1N CONTAINER



Maximum Accepted Weight: Varies by aircraft type.
Maximum Cubic Utilization: 607 cu. ft. (17.19 cu. m.)
Note: The M1N container is a modified M1.
Please call 800.535.2345 for further details.

[↩Back to Top](#)

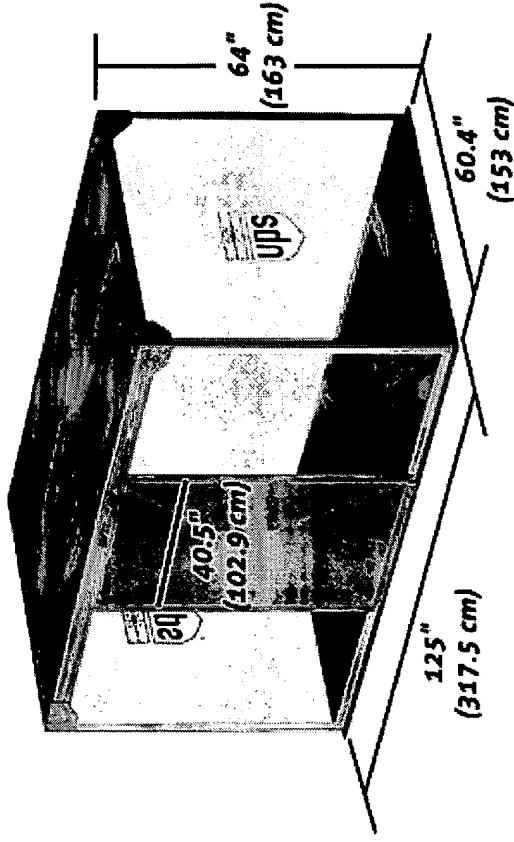
M1N PALLET



Maximum Accepted Weight: Varies by aircraft type.
Maximum Cubic Utilization: 607 cu. ft. (17.19 cu. m.)

[↗Back to Top](#)

L11 CONTAINER



Maximum Accepted Weight: Varies by aircraft type.
Maximum Cubic Utilization: 253 cu. ft. (7.20 cu. m.)

[Back to Top](#)

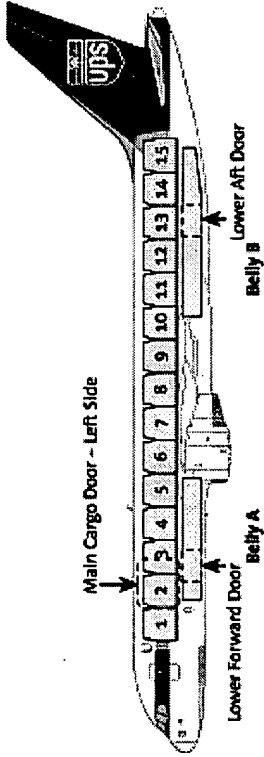
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EXHIBIT B

10/25/2004

B757-200 FREIGHTER



Compartment Load Capacity

Main: 15 - 88" x 125" positions

Belly A:

Belly B:

(224cm. x 318cm.)

700 cu. ft. (19.8 cu. m.)

1,090 cu. ft. (30.9 cu. m)

Cargo Door Dimensions

Main Cargo Door

Lower Forward Door

Lower Aft Door

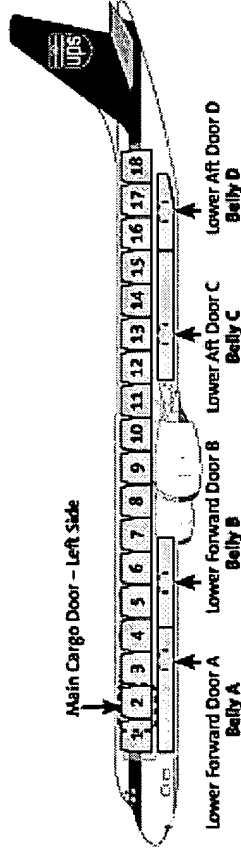
86" x 134" (218cm. X 340cm.)

44" x 55" (112cm. X 140cm.)

44" x 55" (112cm. X 140cm.)

[Back to Top](#)

DC8-70 FREIGHTER



Compartment Load Capacity

Main: 18 - 88" x 125" positions

(224cm. x 318cm.)

7,850 cu. ft. (222.4 cu. m.)

Belly A:
Belly B:
Belly C:
Belly D:

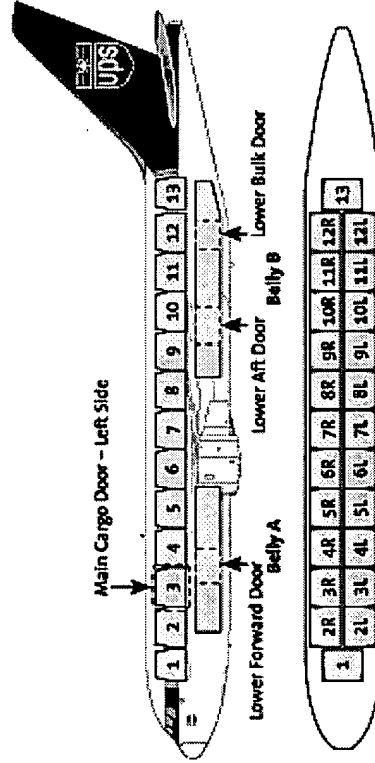
855 cu. ft. (24.2 cu. m.)
435 cu. ft. (12.3 cu. m.)
780 cu. ft. (22.1 cu. m.)
430 cu. ft. (12.2 cu. m.)

Cargo Door Dimensions

Main Cargo Door
140" x 85" (356cm. X 216cm.)
Lower Forward Door A
63" x 54" (160cm. X 137cm.)
Lower Forward Door B
44" x 36" (112cm. X 91cm.)
Lower Aft Door C
63" x 54" (160cm. X 137cm.)
Lower Bulk Door D
36" x 44" (91cm. X 112cm.)

[Back to Top](#)

B767-300 FREIGHTER



Compartment Load Capacity

Main: 24 - 88" x 125" positions
11 - 96" x 125" positions
Belly A: 4 - 88" x 125" x 64"
96" x 125" x 64"
Belly B: 3 - 88" x 125" x 6"
96" x 125" x 64"
(224cm. X 318cm.)
(244cm. X 318cm.)
(224cm. X 318cm. X 163cm.)
(244cm. X 318cm. X 163cm.)
(224cm. X 318cm. X 163cm.)
(244cm. X 318cm. X 163cm.)

Cargo Door Dimensions

Main Cargo Door
103" x 134" (262cm. X 340cm.)

Lower Forward Door A
Lower Aft Door
Lower Bulk Door

67" x 134" (170cm. X 340cm.)
67" x 134" (170cm. X 340cm.)
38" x 45" (97cm. X 114cm.)

Lower Deck

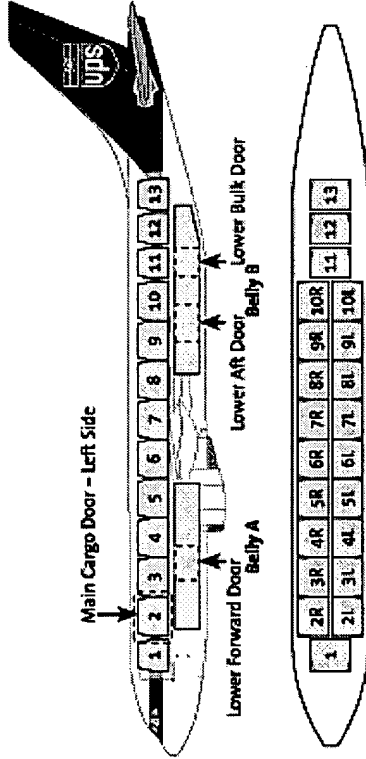
7 - 88" x 125" x 64"
or 7 - 96" x 125" x 64"

2,555 cu. ft (72.4 cu. m.)
4,004 cu. ft (113.4 cu. m.)
430 cu. ft (12.2 cu. m.)

Bulk Cargo Area

[Back to Top](#)

A300-600 FREIGHTER



Compartment Load Capacity

Main: 22 - 88" x 125" positions
Belly A: 5-88" x 125" x 64" positions
Belly B: 3-88" x 125" x 64" positions

(224cm. x 318cm.)
(224cm. X 318cm. X 163cm.)
(224cm. X 318cm. X 163cm.)

Cargo Door Dimensions

Main Cargo Door
Lower Forward Door A
Lower Aft Door
Lower Bulk Door

141" x 102" (358cm. X 259cm.)
106" x 70" (270cm. X 178cm.)
71" x 68" (180cm. X 173cm.)
37" x 25" (94cm. X 64cm.)

Lower Deck

Forward cargo compartment:

- 4 - 88" x 125" x 64"
- or 96" x 125" x 64"

Aft cargo compartment:

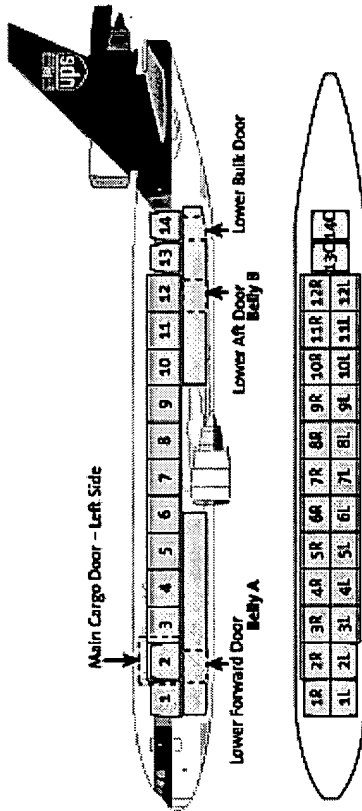
- 3 - 88" x 125" x 64"
- or 96" x 125" x 64"

Bulk cargo area

↕Back to Top

- 1,460 cu. ft (41.5 cu. m.)
- 2,288 cu. ft (64.8 cu. m.)
- 1,095 cu. ft (31.3 cu. m.)
- 1,716 cu. ft (48.6 cu. m.)
- 611 cu. ft (17.3 cu. m.)

MD-11 FREIGHTER



Compartment Load Capacity

- Main: 22 - 96" x 125" positions
- 4 - 88" x 125" positions
- Or: 26 - 88" x 125" positions
- Belly A: 6 - 88" x 125" x 64"
- Belly B: 7 - 60.4" x 125" x 64"

- (224cm. x 318cm.)
- (244cm. x 318cm.)
- (224cm. X 318cm.)
- (224cm. X 318cm. X 163cm.)
- (153cm. X 318cm. X 163cm.)

Cargo Door Dimensions

- Main Cargo Door
- Lower Forward Door A
- Lower Aft Door
- Lower Bulk Door

- 140" x 102" (356cm. X 260cm.)
- 104" x 66" (256cm. X 168cm.)
- 70" x 66" (178cm. X 168cm.)
- 36" x 30" (92cm. X 76cm.)

Lower Deck**Forward cargo compartment:**

6 - 88" x 125" x 64"

Aft cargo compartment

7 - 60.4" x 125" x 64"

Bulk cargo area

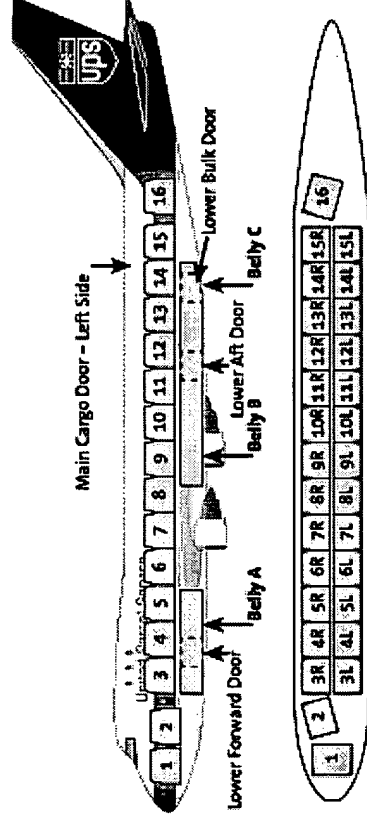
2,190 cu. ft (62.0 cu. m.)

1,771 cu. ft (50.4 cu. m.)

510 cu. ft (14.5 cu. m.)

[↑Back to Top](#)

B747-100 FREIGHTER

**Compartment Load Capacity**

Main: 29-88" x 125" positions

29-96" x 125" positions

Belly A: 5 - 88" x 125" x 64"

Belly B: 4 - 88" x 125" x 64"

Belly C:

(224cm. x 318cm.)

(224cm. x 318cm.)

(224cm. X 318cm. X 163cm.)

(224cm. X 318cm. X 163cm.)

1,000 cu. ft. (28.3 cu. m.)

Cargo Door Dimensions

Main Cargo Door-Left Side

Lower Forward Door

Lower Aft Door

Lower Bulk Door

120" x 134" (305cm. X 340cm.)

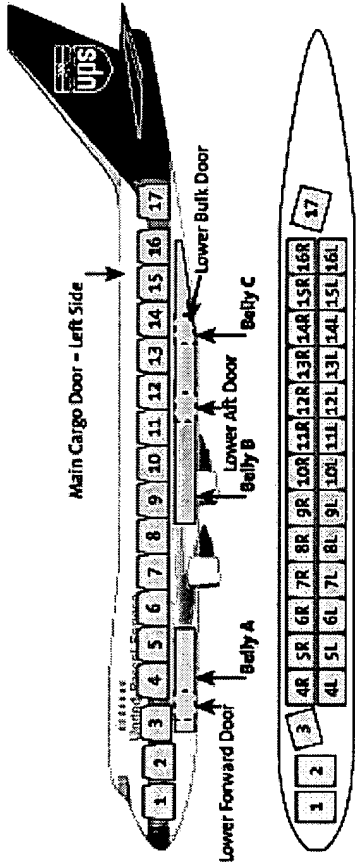
66" x 104" (168cm. X 264cm.)

66" x 104" (168cm. X 264cm.)

44" x 47" (112cm. X 119cm.)

[↑Back to Top](#)

B747-200 FREIGHTER



Compartment Load Capacity

Main: 30 - 88" x 125" positions

30 - 96" x 125" positions

Belly A: 5 - 88" x 125" x 64"

Belly B: 4 - 88" x 125" x 64"

Belly C:

(224cm. x 318cm.)

(224cm. x 318cm.)

(224cm. X 318cm. X 163cm.)

(224cm. X 318cm. X 163cm.)

1,000 cu. ft. (28.3 cu. m.)

Cargo Door Dimensions

Main Cargo Door

Lower Forward Door

Lower Aft Door

Lower Bulk Door

Back to Top

120" x 134" (305cm. X 340cm.)

66" x 104" (168cm. X 264cm.)

66" x 104" (168cm. X 264cm.)

44" x 47" (112cm. X 119cm.)

EXHIBIT C



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Delta Shipping Containers

Delta Air Logistics shipping containers are designed to help control packaging and transportation costs and improve security. Containers are available in a range of types and sizes. Palletized shipments will be accepted as containers if they are properly restrained. See our bin charts for the narrow body aircraft.

Aircraft & Container Compatibility Chart

Aircraft Type	Container Type
B-767-200	LD-2, LD-8
B-767-300	LD-2, LD-8
B-767-400ER	LD-2, LD-8, LD-7
B-777-200	LD-3, LD-7, LD-11
MD-11	LD-3, LD-7, LD-11
All aircraft	E, EH

Bin Charts

Aircraft Type	Bin Space
B-737-200	Forward Cargo Compartment: 48W x 34H AFT Cargo Compartment: 48W x 35H
B-737-300	Forward Cargo Compartment: 48W x 34H AFT Cargo Compartment: 48W x 35H
B-737-800	Forward Cargo Compartment: 48W x 35H AFT Cargo Compartment: 48W x 31-35H

MD-88/MD-90

Forward Cargo Compartment Bin 1: 53W x 31H

Mid Cargo Compartment Bin 2: 53W x 31H

AFT Cargo Compartment Bin 3/4: 53W x 30H

B-757-200

Forward Cargo Compartment Fwd of Door: 55W x 42.5H

AFT Cargo Compartment Fwd of Door: 55W x 44H

Return to top**LD-2**

IATA Class Rating—8D

Carrier owned

120 cubic feet (3.39 cu. meters)

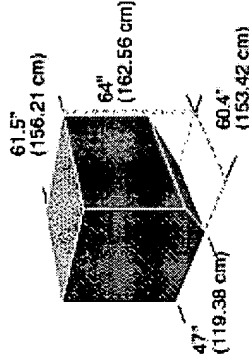
2,400 lbs. maximum net weight (1,088 kg)

Carried on B-767 aircraft

Door dimensions --

DPA 59 in. h. (149.86 cm) by 41 in. w. or 43 in. w. (109.22 cm)

DPN 56 in. h. (142.22 cm) by 43 in. w. (109.22 cm)

**LD-3 IATA Class Rating - 8**

Carrier owned

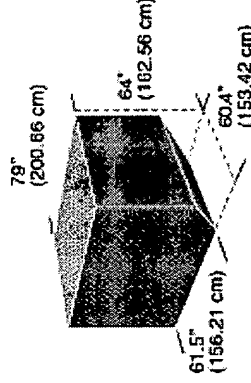
150 cubic feet (4.25 cu. meters)

3,200 lbs. Maximum net weight (1,452 kg)

Carried on and MD-11 aircraft

Door dimensions --

59 in. h. (149.86 cm) by 57 in. w. (144.78 cm)

**LD-7/88" PALLET**

IATA Class Rating - 5

Carrier owned

450 cubic feet (12.74 cu. meters)

9,900 lbs. Maximum net weight (4,490 kg)

Carried on B-767-332 ER and MD-11 aircraft

LD-7/96" PALLET

IATA Class Rating - 2BG

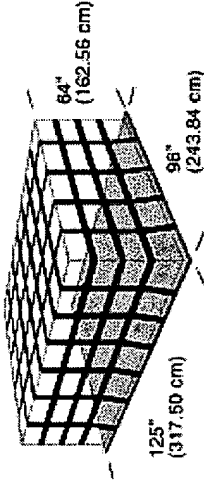
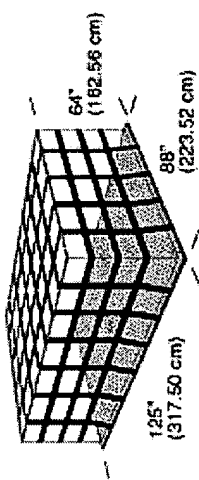
Carrier owned

450 cubic feet (12.74 cu. meters)

10,900 lbs. Maximum net weight (4,944 kg)

Carried on B-767-332 ER and

MD-11 aircraft



LD-8

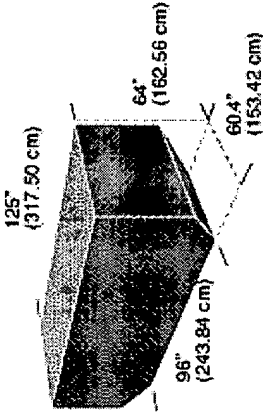
IATA Class Rating - 6A

Carrier owned

240 cubic feet (6.80 cu. meters)

5,100 lbs. Maximum net weight (2,313 kg)

Carried on B-767 aircraft



Door dimensions –

59 in. h. (149.86 cm) by 88 in. w. (223.59 cm)

LD-11

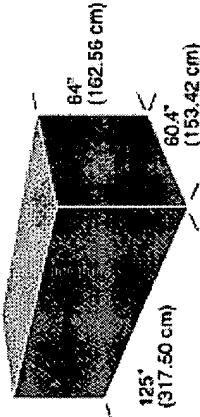
IATA Class Rating - 6

Carrier owned

300 cubic feet (8.50 cu. meters)

6,500 lbs. Maximum net weight (2,948 kg)

Carried on MD-11 aircraft

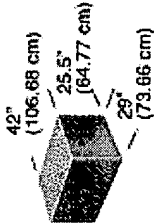


Door dimensions –

59 in. h. (149.86 cm) by 119 in. w. (302.26 cm)

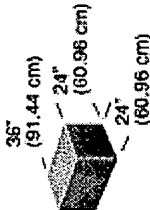
E

Shipper owned
18 cubic feet (.51 cu. meters)
500 lbs. Maximum gross weight (227 kg)



EH

Shipper owned



Return to top

Bin Charts

737-200 Narrow Body Aircraft

Forward Cargo Compartment—48W X 34H

Width/ Height	5	10	15	20	25	30	35	40	45
34	122	119	117	116	100	83	57	57	57
32	128	124	122	120	108	90	57	57	57
30	133	128	126	124	115	102	57	57	57
28	137	132	130	127	121	111	57	57	57
26	141	135	133	130	126	120	57	57	57
24	144	138	136	133	130	126	57	57	57
22	146	141	139	136	134	129	62	57	57

20	149	143	141	138	137	132	62	57	57
18	151	146	144	141	140	134	62	57	57
16	153	148	146	141	142	137	62	57	57
14	155	150	148	145	144	140	138	57	57
12	157	152	150	147	146	142	142	57	57
10	158	154	151	149	148	144	143	134	57
5	162	158	155	154	151	148	143	142	130

Length (IN)¹

¹ Maximum length of a single piece of cargo is determined by taking the height and width and finding the intersecting value. All values are in inches. Maximum weight for a single piece of cargo on a narrow body aircraft is 300 lbs.

AFT Cargo Compartment—48W X 35H

Width/ Height	5	10	15	20	25	30	35	40-45
34	144	142	138	124	NA ²	NA ²	NA ²	NA ²
32	156	153	151	140	NA ²	NA ²	NA ²	NA ²
30	164	160	159	150	136	95	95	95
28	169	166	164	157	143	95	95	95
26	172	170	169	163	150	95	95	95
24	175	173	172	168	157	95	95	95
22	177	175	174	171	164	95	95	95
20	180	178	177	174	171	95	95	95
18	182	180	179	176	172	95	95	95
16	184	182	181	178	174	169	95	95
14	186	184	182	180	175	174	95	95
12	188	186	184	181	177	175	95	95

10	190	188	185	183	178	177	95	95
5	194	191	188	186	182	181	169	95

Length (IN)¹

¹ Maximum length of a single piece of cargo is determined by taking the height and width and finding the intersecting value. All values are in inches. Maximum weight for a single piece of cargo on a narrow body aircraft is 300 lbs.

² Not Applicable

Return to top

737-300 Narrow Body Aircraft

Forward Cargo Compartment—48W X 34H

Width/ Height	5	10	15	20	25	30	35	40	45
34	142	140	136	114	76	76	65	56	56
32	142	140	140	130	86	86	74	66	60
30	146	144	142	136	86	86	84	76	65
28	146	144	144	144	86	86	86	84	74
26	153	150	148	144	140	86	86	86	78
24	156	152	150	148	146	86	86	86	84
22	158	156	152	150	146	86	86	86	86
20	160	159	154	153	146	86	86	86	86
18	164	160	158	156	154	86	86	86	86
16	165	162	160	158	156	86	86	86	86
14	167	164	161	159	157	154	86	86	86
12	169	166	163	160	158	155	86	86	86
10	171	167	164	162	160	157	86	86	86
5	173	168	166	164	162	160	150	86	86

Length (IN)¹

¹ Maximum length of a single piece of cargo is determined by taking the height and width and finding the intersecting value. All values are in inches. Maximum weight for a single piece of cargo on a narrow body aircraft is 300 lbs.

AFT Cargo Compartment—48W X 35H

Width/ Height	5	10	15	20	25	30	35	40	45
34	136	124	112	104	NA ²	NA ²	NA ²	NA ²	NA ²
32	137	127	115	103	NA ²	NA ²	NA ²	NA ²	NA ²
30	138	130	120	110	100	90	79	68	69
28	150	140	130	120	110	100	90	77	66
26	160	150	140	129	119	108	98	80	70
24	174	160	150	140	130	118	110	100	84
22	176	162	154	142	134	116	108	98	92
20	178	166	156	144	138	120	112	104	96
18	182	170	160	148	140	128	120	114	100
16	195	180	167	155	146	135	126	117	104
14	230	190	173	162	153	142	132	120	106
12	244	200	190	170	160	150	140	126	111
10	248	230	222	208	197	170	150	129	116
5	256	246	242	235	226	198	160	136	118

Length (IN)¹

¹ Maximum length of a single piece of cargo is determined by taking the height and width and finding the intersecting value. All values are in inches. Maximum weight for a single piece of cargo on a narrow body aircraft is 300 lbs.

² Not Applicable

Return to top

737-800 Narrow Body Aircraft**Forward Cargo Compartment—48W X 35H**

Width/ Height	5	10	15	20	25	30	35	40	45	48
34	112	100	90	81	73	67	61	57	54	53
32	131	116	104	94	85	77	71	66	63	62
30	150	131	117	105	95	87	80	74	71	69
28	168	147	124	116	105	95	88	82	77	76
26	188	161	142	126	113	103	94	88	83	81
24	210	177	154	137	122	111	101	94	89	87
22	231	194	167	147	131	118	108	100	94	91
20	254	210	180	157	139	125	114	105	98	96
18	273	228	193	167	147	132	119	110	102	100
16	274	247	206	177	158	139	125	114	106	103
14	275	267	220	188	169	145	130	119	110	107
12	277	273	233	197	171	151	135	123	113	110
10	277	274	250	210	181	159	142	129	118	112
5	280	276	273	242	205	178	158	142	130	116

Length (IN)¹

¹ Maximum length of a single piece of cargo is determined by taking the height and width and finding the intersecting value. All values are in inches. Maximum weight for a single piece of cargo on a narrow body aircraft is 300 lbs.

AFT Cargo Compartment—48W X 31-35H

Width/ Height	5	10	15	20	25	30	35	40	45	48
34	89	77	66	58	52	NA ²	NA ²	NA ²	NA ²	NA ²

32	124	108	93	82	72	64	57	52	49	49
30	160	140	123	110	99	89	81	75	70	67
28	176	152	133	118	105	94	85	78	73	70
26	201	171	148	130	116	104	94	86	80	76
24	228	189	162	142	126	113	102	93	87	82
22	247	206	177	152	134	120	108	99	92	88
20	275	225	191	166	147	128	116	105	97	92
18	338	242	206	176	155	135	122	111	102	97
16	339	265	220	188	164	143	128	116	106	100
14	340	293	238	201	174	153	134	121	111	104
12	341	338	253	212	182	160	143	130	119	107
10	343	339	273	226	190	166	148	133	122	110
5	345	340	337	268	221	188	163	144	131	120

Length (IN)¹

¹ Maximum length of a single piece of cargo is determined by taking the height and width and finding the intersecting value. All values are in inches. Maximum weight for a single piece of cargo on a narrow body aircraft is 300 lbs.

² Not Applicable

Return to top

MD-88/MD-90 Narrow Body Aircraft

Forward Cargo Compartment Bin 1—53W X 31H

Width/ Height	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	52
29	162	153	147	144	133	123	111	107	100	94	90	81	75	68	66	59	50
27	164	156	152	149	140	130	120	114	109	102	99	90	85	76	76	64	54
24	175	160	160	155	150	140	130	123	116	112	104	99	93	85	78	69	60

21	192	180	165	160	158	145	140	132	122	113	108	100	94	87	80	71	65
18	195	190	185	170	160	157	145	138	127	117	110	102	95	88	82	73	68
15	198	197	192	190	175	160	157	146	135	126	122	108	96	90	85	78	71
12	200	198	194	192	180	172	158	154	142	138	125	118	108	94	86	79	72
9	205	200	196	194	185	182	162	158	150	144	130	119	109	95	89	85	78
6	210	205	200	198	190	185	170	160	155	146	134	123	110	100	94	86	85
3	215	210	205	200	198	195	192	175	165	160	140	125	115	106	101	93	88
Length (IN)¹																	

¹ Maximum length of a single piece of cargo is determined by taking the height and width and finding the intersecting value. All values are in inches. Maximum weight for a single piece of cargo on a narrow body aircraft is 300 lbs.

Forward Cargo Compartment Bin 2—53W X 31H

Width/ Height	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	52
29	156	152	147	144	133	123	111	107	109	94	90	81	75	68	66	59	50
27	157	155	152	149	140	130	120	114	119	102	99	90	85	76	76	64	54
24	160	156	155	154	150	140	130	123	116	112	104	99	93	85	78	69	60
21	162	160	156	155	154	145	140	132	122	113	108	100	94	87	80	71	65
18	179	178	162	158	156	154	145	138	127	117	110	102	95	88	82	73	68
15	181	180	170	163	160	156	154	146	135	126	122	108	96	90	85	78	71
12	182	181	176	170	163	158	155	154	142	138	125	118	108	94	86	79	72
9	184	183	182	176	170	162	156	152	150	144	130	119	109	95	89	85	78
6	184	183	182	181	180	178	160	156	155	146	134	123	110	100	94	86	85
3	184	184	183	182	181	179	162	160	157	147	135	125	115	106	101	93	88
Length (IN)¹																	

¹ Maximum length of a single piece of cargo is determined by taking the height and width and finding the intersecting value. All values are in inches. Maximum weight for a single piece of cargo on a narrow body aircraft is 300 lbs.

Forward Cargo Compartment Bin 3/4—53W X 30H

Width/ Height	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	52
29	162	153	147	144	133	123	111	107	100	94	90	81	75	68	66	59	50
27	164	156	152	149	140	130	120	114	109	102	99	90	85	76	76	64	54
24	175	160	160	155	150	140	130	123	116	112	104	99	93	85	78	69	60
21	192	180	165	160	158	145	140	132	122	113	108	100	94	87	80	71	65
18	195	190	185	170	160	157	145	138	127	117	110	102	95	88	82	73	68
15	198	197	192	190	175	160	157	146	135	126	122	108	96	90	85	78	71
12	200	198	194	192	180	172	158	154	142	138	125	118	108	94	86	79	72
9	205	200	196	194	185	182	162	158	150	144	130	119	109	95	89	85	78
6	210	205	200	198	190	185	170	160	155	146	134	123	110	100	94	86	85
3	215	210	205	200	198	195	192	175	165	160	140	125	115	106	101	93	88

Length (IN)¹

¹ Maximum length of a single piece of cargo is determined by taking the height and width and finding the intersecting value. All values are in inches. Maximum weight for a single piece of cargo on a narrow body aircraft is 300 lbs.

Return to top

757 Narrow Body Aircraft

Forward Cargo Compartment Fwd Of Door—55W X 42.5H

Width/ Height	5	10	15	20	25	30	35	40	45	50	55
40	151	139	129	119	109	99	89	79	70	63	57
35	182	163	156	144	134	123	113	103	92	83	76
30	224	194	176	166	152	140	130	119	109	98	89
25	274	235	204	183	168	153	141	131	120	108	98

0-20 278 236 207 183 168 153 141 131 120 108 98

Length (IN)¹

¹ Maximum length of a single piece of cargo is determined by taking the height and width and finding the intersecting value. All values are in inches. Maximum weight for a single piece of cargo on a narrow body aircraft is 300 lbs.

Forward Cargo Compartment Fwd Of Door—55W X 42.5H

Width/ Height	5	10	15	20	25	30	35	40	45	50	55
42	136	134	133	124	114	104	94	84	75	67	60
40	137	136	134	132	124	113	103	93	83	75	67
35	140	138	136	134	132	129	121	111	100	90	82
30	142	140	138	136	133	131	129	124	113	102	93
0-25	144	142	140	137	135	132	130	127	122	110	100

Length (IN)¹

¹ Maximum length of a single piece of cargo is determined by taking the height and width and finding the intersecting value. All values are in inches. Maximum weight for a single piece of cargo on a narrow body aircraft is 300 lbs.

Return to top

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Wide-body aircraft

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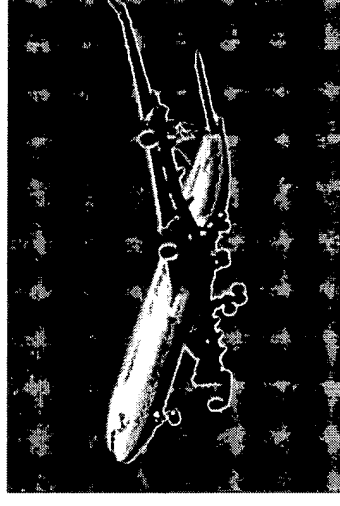
Definition of Wide-body aircraft

A **wide-body aircraft** is a large airliner with a fuselage diameter of about 6 metres and twin aisles. Passengers are usually seated 7 to 10 abreast. For comparison, a traditional **narrow-body** airliner has a diameter of 3 to 4 metres, a single aisle, and seats arranged 4 to 6 abreast. Typical wide-body aircraft can accommodate between 200 and 600 passengers, where the largest narrow-bodies carry about 280. Freight-only versions exist as well, which are similar bar the cargo-loading arrangements.

The first wide-body aircraft was the four-engined Boeing 747 which debuted in 1969 and is still the largest in service, although the Airbus A380 will be larger still, when it enters service in 2006. Slightly smaller and shorter ranged three-engined wide-bodies followed in the early 1970s—the McDonnell Douglas DC-10 and the Lockheed L-1011 Tristar—then the twin-engined Airbus A300 in 1974. Subsequent commercial wide-bodies include the Ilyushin Il-86 (1980), the Airbus A310 (a shortened A300) and Boeing 767 (1982), the McDonnell Douglas MD-11 (1986), the Ilyushin Il-96 (1992), the Airbus A330/A340 family (1993), and the Boeing 777 (1995). The United States and the Soviet Union both produced dedicated military wide-body transports: the Lockheed C-5 Galaxy and C-141 Starlifter, the Ilyushin Il-76 "Candid", the Antonov An-124/An-225, and the Boeing C-17 Globemaster III.

Although a wide-body aircraft has a larger frontal area than a narrow-body of equivalent capacity, and thus greater form drag, it has several advantages:

- Lower ratio of surface area to volume, and thus (for equal volume) lower frictional drag.
- Shorter twin aisles make loading and unloading faster and reduce the difficulty of serving refreshments.
- Shorter overall length, which makes it easier to achieve the desired take-off rotation angle without very long and heavy landing gear.
- Greater under-floor freight capacity.



Wide-body Virgin Atlantic
Airbus A340-300
Larger version

- Simple size: it is possible to make a wide-body aircraft much larger than a narrow-body and, all else being equal, the larger the aircraft the lower the fuel-burn per passenger-mile and the lower the cost.

When traveling in civil airspace (particularly in North America and Europe), operators will often suffix their call sign with the word "Heavy". An example would be the call sign "United Flight 342 Heavy", for a Boeing 777. This is because wide-body aircraft (and one non-wide-body aircraft, the Boeing 757) tend to leave wake vortices as they travel, making the area immediately behind unsafe for other aircraft. The amount of separation between aircraft is a judgement call based upon the size and weight of the leading aircraft.

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